**Mini Project Report**

**On**

# ANTI SLEEP ALARM SYSTEM FOR DRIVERS

## Submitted by


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Chapter 1

# Introduction

**Overview** The Anti Sleep Alarm System is a project designed to prevent drowsy driving and enhance road safety. It is aimed at alerting drivers who may be falling asleep or experiencing fatigue while driving. The system utilizes various sensors and algorithms to detect signs of driver drowsiness and issue timely warnings to keep the driver alert

## Background and Motivation

The motivation for the Anti Sleep Alarm System project is to tackle this problem head-on and improve road safety. By developing a system that can detect signs of driver drowsiness and provide timely alerts, the aim is to prevent accidents caused by drowsy driving and save lives.

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## Objective

Enhance Road Safety: The primary objective is to improve road safety by reducing accidents caused by drowsy driving. The system aims to detect signs of driver drowsiness in real-time and issue timely warnings to keep the driver alert and focused on the road.

Prevent Accidents: The project seeks to prevent accidents caused by drowsy driving by providing proactive alerts to drivers. By intervening before the driver falls asleep or loses control of the vehicle, the system aims to minimize the risk of collisions and potential harm to the driver, passengers, and other road users.

Raise Awareness: Another objective is to raise awareness about the dangers of drowsy driving among drivers. By incorporating an alarm system that activates when drowsiness is detected, the project serves as a reminder to drivers to prioritize their well-being and take necessary breaks to prevent fatigue-related accidents.

Customizability and Adaptability: The system aims to provide customizable settings to accommodate individual driver preferences and requirements. This objective ensures that the system can adapt to different driving patterns, sensitivities, and environments, making it more effective and user-friendly.

# Methodology

1. To implement the above goals the following methodology needs to be followed:
2. Specifying the Application and various components of the project.
3. Specifying the bindings between the tasks and the resources either manually or by the design tools.
4. Specifying the port interconnections between the resources.
5. Analysis: Extracting the data required for analysis and the doing the analysis

Chapter 2

# Tool Description

A physical project is a combination of both hardware and software. Some problems can be simplified by software by which we can operate the hardware portion efficiently. This project is also not an exception, rather we can say it is mostly a software-based project. Let's be familiar with them---

### *HARDWARE COMPONENTS*

1. Arduino Uno microcontroller
2. Gear motor system
3. Transistor and Resistor
4. INFARED SENSOR MODULE
5. Buzzer
6. Power supply

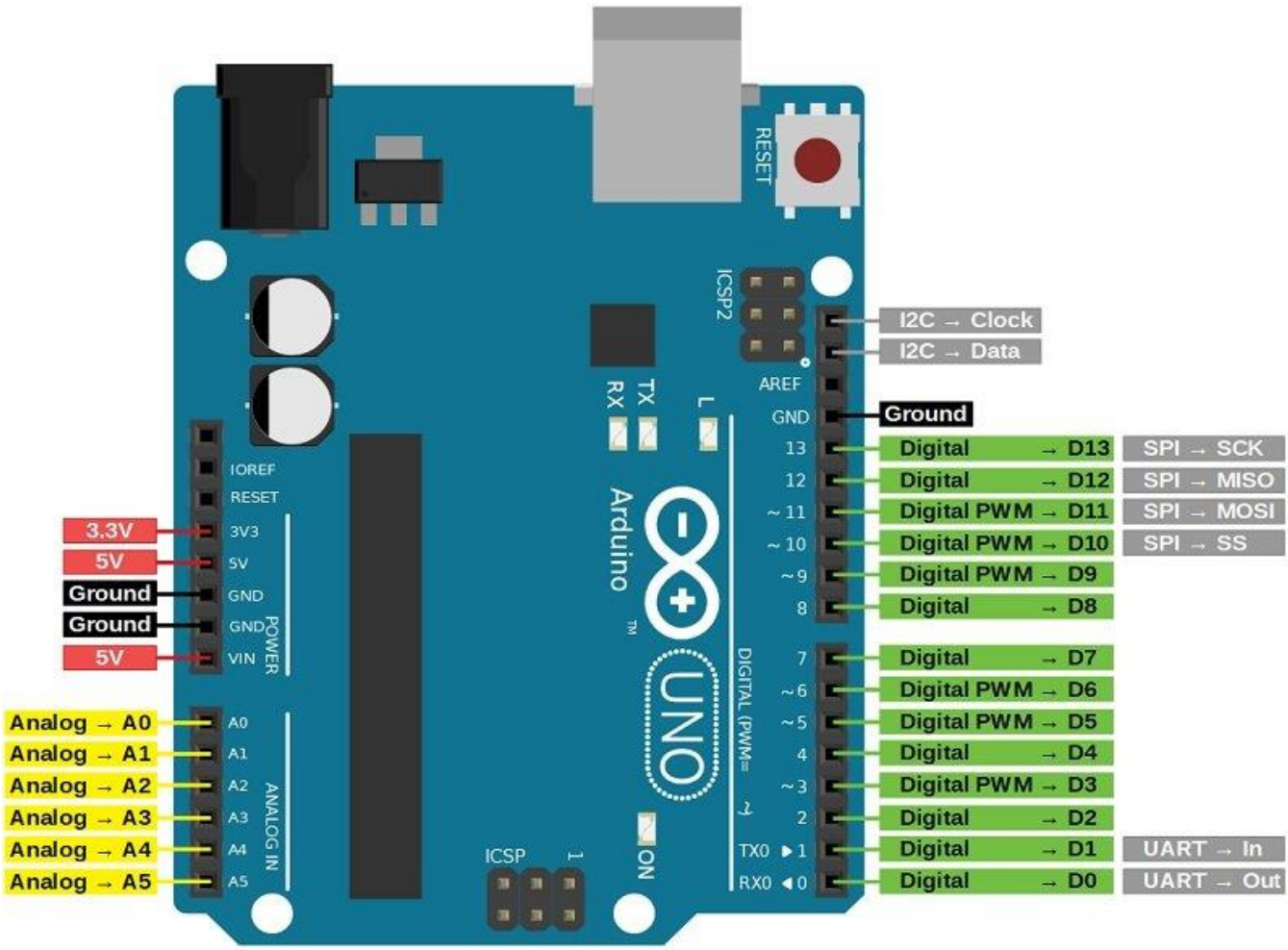
### Description and features

## Arduino Uno microcontroller

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable.[4] It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts. It is similar to the Arduino Nano. The hardware reference design is distributed under a Creative Commons Attribution Share-Alike 2.5 license and is available on the Arduino website. Layout and production files for some versions of the hardware are also available.

The word "uno" means "one" in Italian and was chosen to mark the initial release of Arduino Software. The Uno board is the first in a series of USB-based Arduino boards; it and version 1.0 of the Arduino IDE were the reference versions of Arduino, which have now evolved to newer releases. The ATmega328 on the board comes preprogrammed with a bootloader that allows uploading new code to it without the use of an external hardware programmer.

## Pin Diagram




## Features:

- The operating voltage is 5V
- The recommended input voltage will range from 7v to 12V
- The input voltage ranges from 6v to 20V
- Digital input/output pins are 14
- Analog i/p pins are 6
- DC Current for each input/output pin is 40 mA
- DC Current for 3.3V Pin is 50 mA
- Flash Memory is 32 KB
- SRAM is 2 KB
- EEPROM is 1 KB
- CLK Speed is 16 MHz

## GEAR SYSTEM:-

The 200 RPM Dual Shaft BO Motor - Straight motor gives good torque and rpm at lower operating voltages, which is the biggest advantage of these motors.

Small shaft with matching wheels gives an optimized design for your application or robot. Mounting holes on the body & light weight makes it suitable for in-circuit placement. This motor can be used with 69mm Diameter Wheel for Plastic Gear Motors.

It is an alternative to our metal gear DC motors. It comes with an operating voltage of 3-12V and is perfect for building small and medium robots.

**Specifications of 200 RPM Dual Shaft BO Motor -**

- Shaft length: 7 mm
  Motor Design: Straight Dual Shaft
- Shaft Diameter: 5.5 mm
- Size: 55 x 48 x 23 mm.
- Operating Voltage: 3 to 12V.
- Current (without loading): 40-180mA.
- RPM: 200 rpm.
- Output Torque: 0.35 kg cm.

## Features:

Cost-effectiveness of the injection-molding process.
Elimination of machining operations.
Low density: lightweight, low inertia.
Uniformity of parts.
Capability to absorb shock and vibration as a result of elastic compliance.
Ability to operate with minimum or no lubrication, due to inherent lubricity.
The relatively low coefficient of friction.

## Application:

- Various types of project
- DIY projects

## **Wheel system :**

65mm Robot Wheel for BO Motors is a circular component that is intended to rotate on an axial bearing. The wheel is one of the main components of the wheel and axle which is one of the six simple machines. Wheels, in conjunction with axles, allow heavy objects to be moved easily facilitating movement or transportation while supporting a load, or performing labor in machines.

## Features:

Car hub is reinforced nylon, very sturdy.
The tire is made of a soft rubber for non-slip effect.
Good load capacity and greater ability to grip
Robot Wheel Material: Plastic+Rubber

## **Specification** :

Loading Capacity (Kg)----2.5

D hole For BO Motor------6 mm

Weight (gm)------34

Wheel Diameter(mm)------65 mm

Color------Black (Tyre), Yellow (Rim)

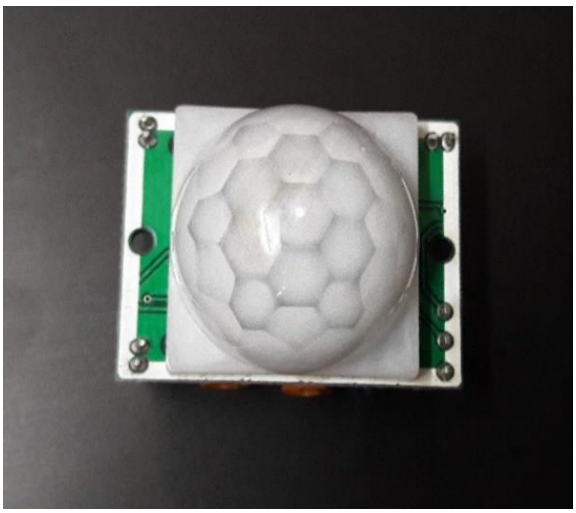
Wheel Width------27 mm

Body Material------Plastic

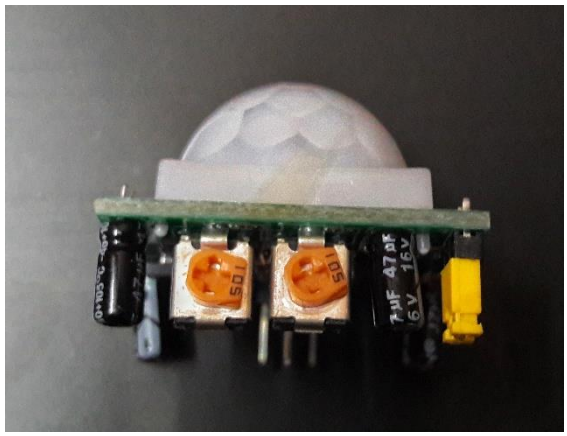
Grip Material-----Rubbe

# PIR Motion Detector Sensor Module

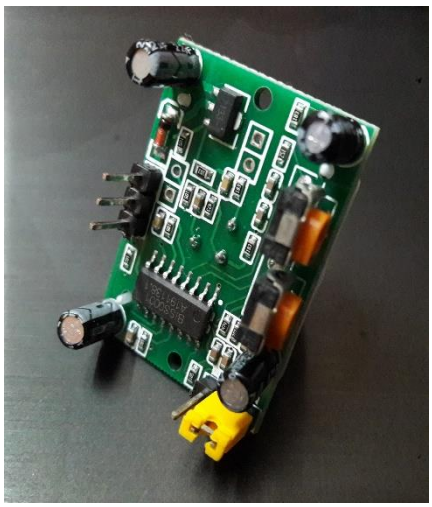
The Passive Infrared Sensor (PIR) sensor module is used for motion detection. It is often referred to used "PIR", "Pyroelectric", "Passive Infrared" and "IR Motion" sensor. The module has an on-board pyroelectric sensor, conditioning circuitry and a dome shaped Fresnel lens. It is used to sense movement of people, animals, or other objects. They are commonly used in burglar alarms and automatically-activated lighting systems.
In our project it is used to sense any human movement. When anyone is near this sensor the whole system will be in operating state.



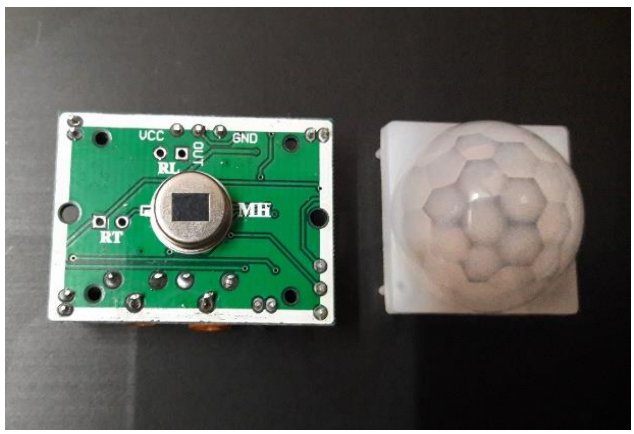
**Front side**



**Side view**



**Back panel**




**Top side with Fresnel lens**

## Interface pin for PIR Sensor

1. **VCC:** 3.3 to 5 volts
2. **OUT:** for taking the output
3. **GND:** Ground

## Features:

- Color: White + Green or White + Blue
- Infrared Sensor with Control Circuit Board
- The Sensitivity and Holding Time Can be Adjusted
- Working Voltage Range: DC 4.5V- 20V
- Current Drain: <60uA
- Detection Range: <140°
- Voltage Output: High/Low level Signal: 3.3V TTL output
- Detection Distance: 3 to 7m (can be adjusted)
- Delay Time: 5 to 200s (Can be Adjusted, Default 5s +/- 3%)
- Blockade time: 2.5s (Default)
- Work temperature: -20-+80°C
- Dimension: 3.2cm x 2.4cm x 1.8cm (Approx.)
- Sensitive Setting: Turn to Right, Distance Increases (About 7M); Turn to Left, Distance Reduce (About 3M)
- Time Setting: Turn to Right, Time Increases (About 200S); Turn to Left, Time Reduce (About 5S).

## Applications:

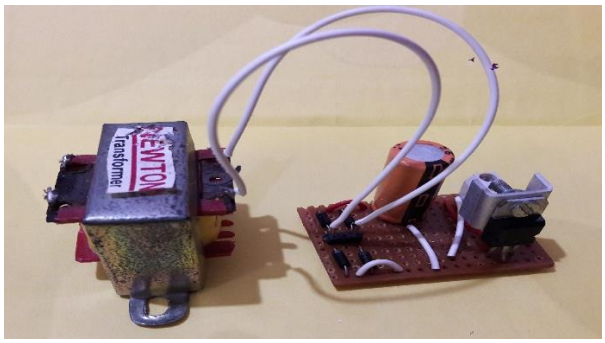
For any type of motion detection. It is mainly used in automated doors and automatic light in stairs.

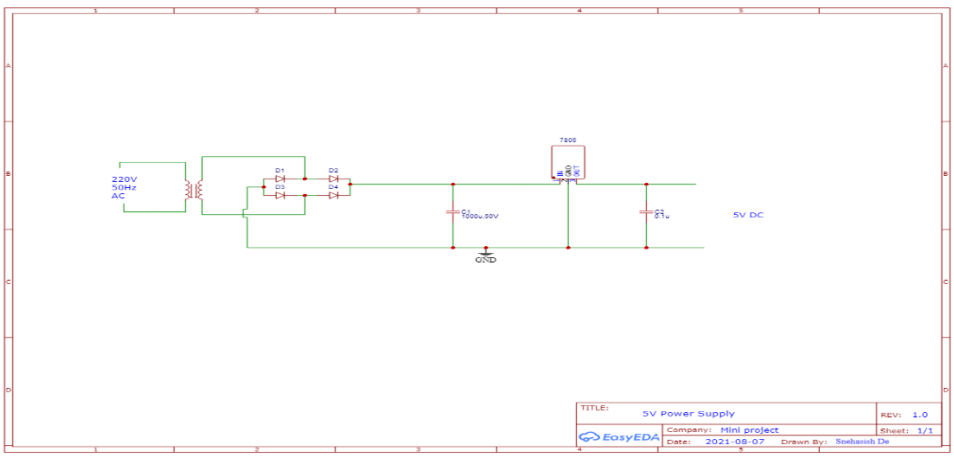
# Speaker

A speaker is used in this project to monitor over temperature. If anyone has temperature more than 100degree F, the speaker will blow on. We have used an 8-ohm 0.5-watt speaker.


# Power supply

In this project we have used a 5V power supply using a transformer and a 7805 IC. The schematic and the image of the supply is attached below:



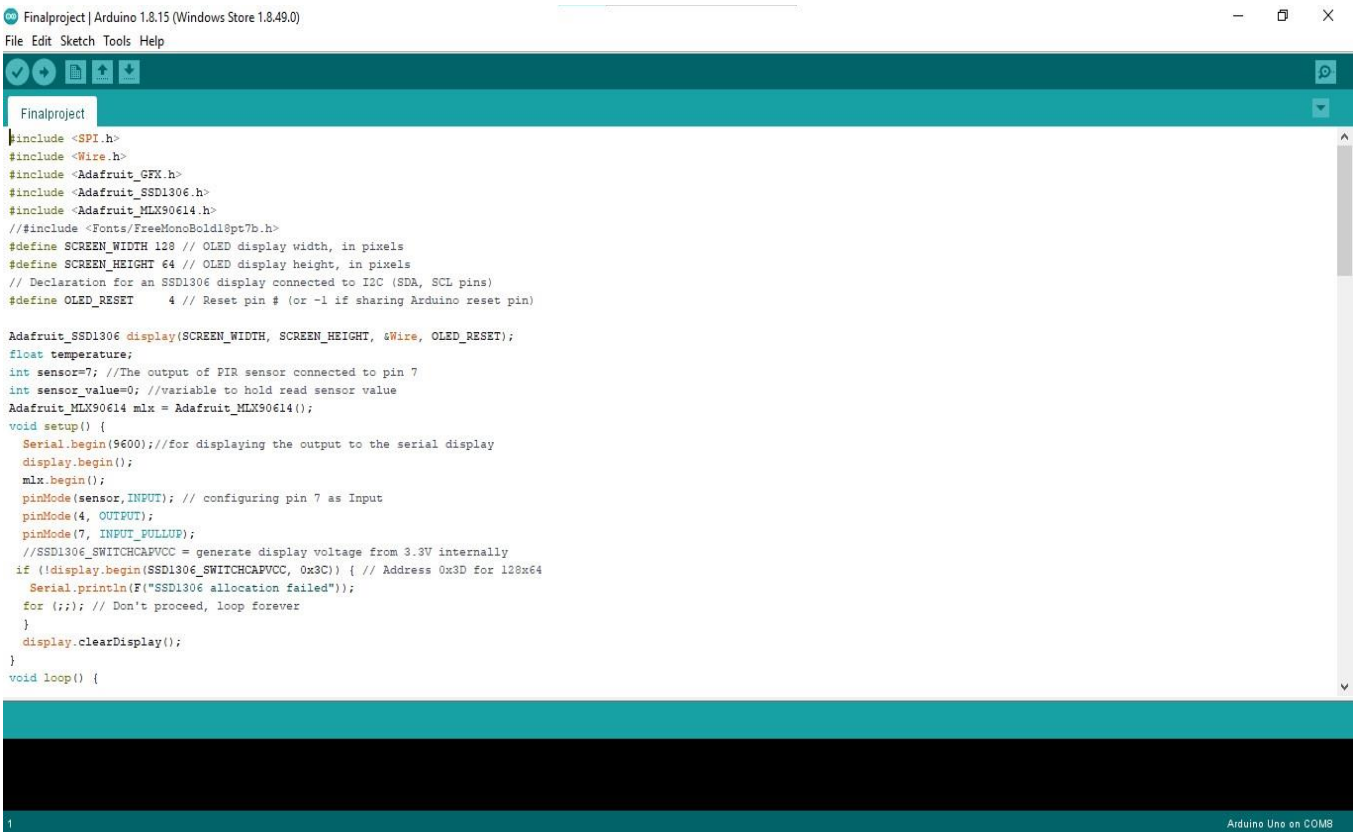
## *SOFTWARE COMPONENTS*

1. Arduino IDE

### Description and features

# Arduino IDE

Arduino IDE is a software to program an Arduino microcontroller chip. As discussed earlier we are using an Arduino microcontroller, so we need to program the chip as our need. We have used the Arduino IDE software to program the chip. Here are some of the snaps of the same



Chapter

3

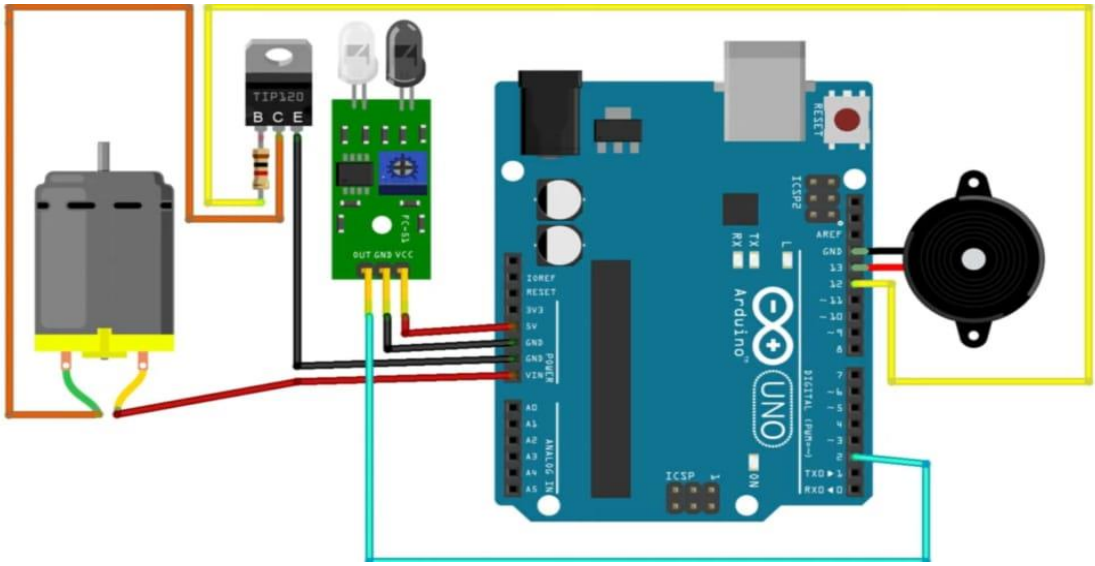
# Circuit Operation

## *Circuitry:*

There is only one physical circuitry, the power supply. This power supply is made by using ---

- **A 5V DC voltage via adapter**
- **A arduino uno microcontroller.**
- **One TIP122G NPN RESISTOR for connection**
- **One piezo Buzzer and one 1k ohm Resistar.**
- **One IR SENSOR, and Gear and motor system**
- **Some jumper wires.**

The schematic of the circuit is given below:




As shown in the schematic, at first the Arduino connected to dc power. . Then the buzzer and gear system are both connected with pin 12&13 indivudially. The resistor connected with transistor base point to trigger the gear motor. Then the IR sensor output is connected in Arduino digital pin 2. Then the IR SENSOR IC takes 3.2v input voltage .Thus, we get the system operational .

In this project the main work is done by a Microcontroller. So have written some codes. They are given below:

**Program Code*:***

```
const int blinkPin = 2;
const int motorPin =  13;
const int buzzerPin =  12;

long time;
int TimeDelay()
{
 long t=millis()-time;
 t=t/1000;
 return t;
}

void setup() {
  pinMode(motorPin, OUTPUT);
  pinMode(buzzerPin, OUTPUT);
  pinMode(blinkPin, INPUT);
```

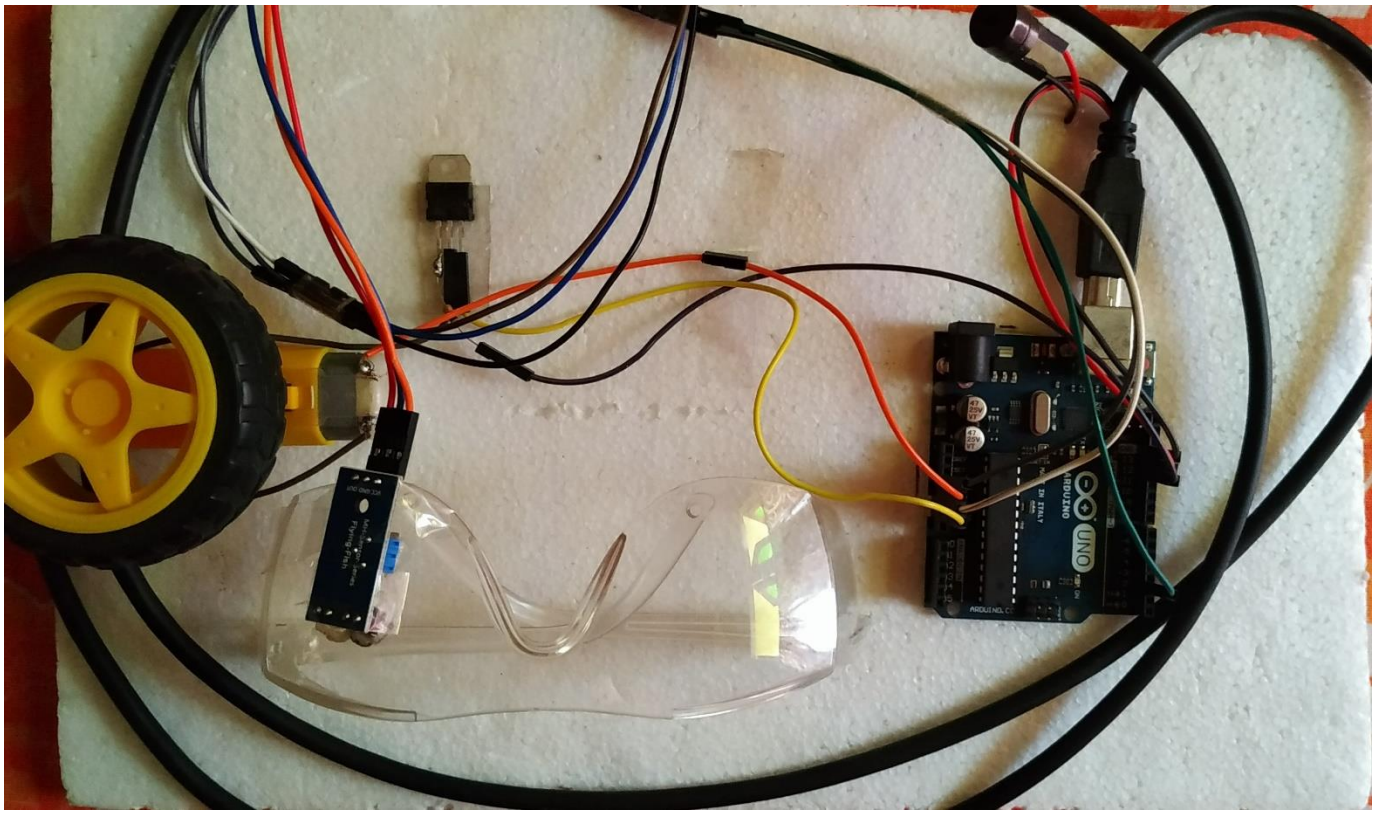
```
  digitalWrite(motorPin, HIGH);
}

void loop() {s

 if(!digitalRead(blinkPin)){
  time=millis();
  while(!digitalRead(blinkPin)){
   if(TimeDelay()>=2)digitalWrite(buzzerPin, HIGH);
   if(TimeDelay()>=5)digitalWrite(motorPin, LOW);
   delay(1000);
   }
 }
 else digitalWrite(buzzerPin, LOW),digitalWrite(motorPin, HIGH);

}
```

***PROJECT PICTURE:***




***PROJECT COSTING:***

| **Project components** | **Quantity(pcs)** | **Price** |
|---|---|---|

| | | |
|---|---|---|
| **1.ADRUINO UNO** | **1** | 900 |
| **2.GEAR** | 1 | 85 |
| **3.MOTOR** | 1 | 45 |
| **4.RESTTOR** | 5 | 10 |
| **5.TRANSISTOR** | 1 | 15 |
| **6.JUMPER WIRE** | 18 | 90 |
| **7.INFAREDSESNSOR** | 1 | 120 |
| **8.SUNGLASS** | 1 | 70 |
| **9.USB CABEL** | 1 | 100 |
| **10.GUM** | 1 | 15 |
| **11.BUZZER** | 1 | 10 |
| **12. Extra** | | 40 |
| TOTAL | | 1500 |

# Result:

As discussed in the introduction, this project aims a physical interaction system. This system helps us to implement this idea. This system does not need any physical interaction. Anyone can check the system by switching on and verify the process of this system.

# Conclusion:

The anti-sleep alarm system project aimed to address the issue of drowsiness and fatigue, particularly in situations where it can pose a risk, such as driving. The project involved designing and implementing a system that could monitor a person's alertness levels and provide timely alerts to prevent potential accidents.

Chapter 4

# Future work & References

1. Sensor Enhancement: Explore advanced sensor technologies to improve the accuracy and reliability of detecting drowsiness. For example, researching and incorporating new types of sensors or combining multiple sensor inputs could provide more precise measurements of alertness levels.

2. Mobile Applications: Create companion mobile applications that complement the anti-sleep alarm system. These apps could provide additional functionalities such as sleep tracking, personalized recommendations for improving sleep quality, and monitoring fatigue levels even when not using the alarm system.
3. Integration with Vehicle Systems: Collaborate with automobile manufacturers to integrate the anti-sleep alarm system with existing vehicle safety features. This could involve connecting the system to in-car monitoring systems, such as lane departure warnings or adaptive cruise control, to enhance overall driver safety.
4. Machine Learning and AI: Investigate the application of machine learning and AI algorithms to enhance the system's ability to detect patterns of drowsiness and fatigue. Training models on large datasets of physiological and behavioral indicators can potentially improve the system's accuracy and adaptability.

# References:

Here are some sites from where we took help in the process of implementing the project—

- https://www.arduino.cc/

Except this sites we also took help from some youtube videos, some blogs etc.s